Remarks/Arguments

I. Status of Claims:

Claims 1-34 were pending in the application as filed. In response to a restriction requirement, claims 8-14, 17-20, and 22-34 were withdrawn from consideration. Thus, claims current pending are claims 1-7, 15, 16, and 21.

Claims 1, 2, 4, 6, 7, 15, 16, and 21 are rejected under 35 USC 112, first paragraph for lack of enablement;

Claims 1, 2, 4, 6, 7, 15, 16, and 21 are rejected under 35 USC 112, first paragraph, as containing subject matter which was not described in such a way as to reasonably convey to one skilled in the art that the inventors at the time of the invention had possession of the claimed invention;

Claims 1, 2, 15, 16, and 21 are rejected under 35 USC 112, second paragraph as being indefinite.

Claims 1, 2, 15, and 21 are rejected 35 USC 102 (b) as being anticipated by Harpold et al. (WO 95/04822, "Harpold");

Claims 16 is rejected under 35 USC 103 (a) as be obvious over Harpold;

Claims 3 and 5 are objected to for reciting non-elected sequence SEQ ID NO: 4 and are allowable if recitation to SEQ ID NO: 4 is deleted.

Claims 35 and 36 are new claims added by this amendment.

The Examiner also pointed out that an abstract was not included in the application as filed. Applicants hereby submit an abstract, which is provided on a separate sheet, page 9 of this paper.

II. Responses to Objections/Rejections

1. Rejection to Claims 1, 2, 4, 6, 7, 15, 16, and 21 are rejected under 35 USC 112, first paragraph for lack of enablement

With regards to Claims 1, 2, 4, 6, 7, 15, 16, and 21, the Examiner acknowledged that the specification is enabling for: a) an isolated DNA sequence encoding a polypeptide which is a voltage activated calcium channel (VSCC) α2δ-C subunit comprising SEQ ID NO: 3; b) an isolated NDA sequence encoding a polypeptide which is a voltage activated calcium channel (VSCC) α2δ-C subunit that hybridizes to SEQ ID NO: 3 on a filter support at 65 °C in 7% SDS and 0.125 M sodium phosphate, followed

by washing in 1% SDS, 20 mM phosphate buffer and 1 mM EDTA at 65 °C for between about 30 minutes to 4 hours; and c) an isolated an isolated NDA sequence encoding a polypeptide which is a voltage activated calcium channel (VSCC) α2δ-C subunit that has at least 70% sequence identity to SEQ ID NO: 3. However, the examiner rejected theses claims under 35 USC 112, first paragraph on the ground that the specification "does not reasonably provide enablement for isolated DNAs that hybridizes to or share sequence identity with SEQ ID NO: 3 that does not encode a voltage activated calcium channel (VSCC) α2δ-C subunit."

The Examiner appears to have alleged two grounds for the rejection. The first ground appears to be that the specification is not enabling as to the DNAs that doe not encode VSCC α2δ-C subunit. (Paper 8, page 3, lines 5-11 and 13-16). Applicants by this amendment have amended claims 1, 2, 3, and 4, which has fully addressed this ground of rejections to these claims. Specifically, Applicants have amended claims 1, 2, and 4 by adding the limitation that the DNA sequence "encodes a polypeptide that is a voltage activated calcium channel α2δ-C subunit," and as such the rejection to these claims on the first ground is overcome.

Claim 6 recites the DNA sequence of claim 3 or 4. According to the Examiner, claim 3 is allowable if recitation to SEQ ID NO: 4 is deleted. Applicants by this amendment have amended claim 3 by deleting recitation to SEQ ID NO: 4, which place claim 3 in condition for allowance. Because the rejection to claims 3 and 4 based on first ground is overcome, the rejection to claim 6 on this ground is mooted.

Claim 7 recites the NDA sequence of claim 6. As the rejection to claim 6 on the first ground is overcome as explained above, the rejection to claim 7 on this ground is mooted.

Claims 15, 16, and 21 each recites the DNA sequence of Claim 1, 2, or 3. Because rejection to claims 1, 2, and 3 on the first ground is overcome as explained above, rejection to these claims on the first ground is also mooted.

The second ground of rejection appears to be that "the disclosure does not teach how to make and use the genus of DNAs that do encode VSCC α2δ-C subunit but are encompassed by the scope of the claims in terms of hybridization, sequence identity, or (as in claim 1) substantial sequence similarity." (Paper 8, page 3, lines 11-13). This

ground of rejection, as the Applicants understood, only applies to claims 1, 2, 4, 15, 16, and 21. The Examiner also requires that the hybridization conditions be recited in the claims. (Paper 8, page 3, bottom three lines). The Applicants respectfully disagree with the Examiner on this ground of rejection. It is the Applicants' position that the disclosure of the specification, couple with what is known in the art, adequately teach how to make and use the DNA sequences encoding a VSCC α2δ-C subunit without undue experimentation. The full sequence of the α2δ-C protein and the full sequence of the DNA that encodes the α2δ-C protein have been disclosed in the specification. Methods and techniques for preparing polynucleotide sequence having various degree of sequence homology or similarity to a known polynucleotide sequence, or various degree of homology or similarity to a polynucleotide sequence encoding a protein of known sequence, are well known in the art. Information on how make the claimed nucleotide sequences is detailed in the specification, see, for example, line 24, page 12, through line 18, page 15. Specifically, on the bottom paragraph of page 12 of the specification, it is stated that the polynucleotide of the invention may be produced by a variety of methods including in vitro chemical synthesis, that the polynucleotide of the invention may be derived from cDNA or genomic libraries, and that "persons of ordinary skill in the art are familiar with the degeracy of the genetic code and may readily design polynucleotide that α2δ-C and/or α2δ-D proteins that have either partial or polynucleotide sequence homology to naturally occurring polynucleotide sequences encoding α2δ-C and/or α2δ-D proteins." Applicants also adequately teach the hybridization method that can be used to make the invention. Applicants also submit that the disclosure of the specification, coupled with what is known in the art, teaches a person skilled in art how to use the claimed invention without un due experimentation. For example, the various uses of the polynucleotides of the invention are detailed on last paragraph of page 15 of the application, such as use as hybridization probe to recover α2δ-C protein from genetic libraries, as primers for the amplification of α2δ-C encoding polynucleotide or a portion thereof, as probes and amplification primers to detect mutations in α2δ-C protein encoding genes. Other uses, either disclosed or not disclosed in the specification, will be immediately apparent to a person skill in the art in view of the teaching the specification.

For the above reasons alone, Applicants submit that the above ground of rejection should be withdrawn.

Nonetheless, to expedite the allowance of the claims, Applicants by this amendment have amended claims 1, 2, 3, and 4, which is explained below.

Claim 1 is being amended whereby the phrase "substantially similar" is replaced with the phrase "having at least a 70% identity." Because the specification is enabling for an isolated DNA sequence encoding VSCC α2δ-C subunit that has at least a 70% sequence identity to SEQ ID NO: 3, as the Examiner concedes, by this amendment the rejection to claim 1 based on the second ground is overcome.

Claim 2 is directed to a DNA sequence that hybridizes to the DNA sequence of SEQ ID NOS 3 or 4 under high stringency hybridization conditions. The Examiner requires that the hybridization conditions be recited in the claims. (Paper 8, page 3, bottom three lines). Applicants disagree with the Examiner on this ground for the following reasons. The claim is drawn to DNA sequences all of which must encode a VSCC α2δ-C subunit, and thus is relatively narrow in scope. The hybridization techniques using a known DNA as a probe under high stringent conditions were conventional in the art at the time of filing. The "high stringency hybridization conditions" recited in the claim are clearly defined and specified in the specification (See specification spanning from line 29 on page 14 to line 5 on page 15.) The specification further teaches the preferred and most preferred "low salt hybridization buffer. (Page 15, lines 2-5). A person skilled in the art in view of the disclosure coupled with what is known in the art would be able to make and use the claimed invention without undue experimentation. If any experimentation is needed, it will be routine. Nonetheless, in order to receive an expedient allowance of the claim, Applicants have amended the claim to recite the high stringency hybridization conditions as required by the Examiner. The Applicants reserve the right to pursue the subject matter excluded by this amendment in a divisional application.

Claim 4, as amended, is directed to an isolated and purified NDA sequence that has at least a 70% identity to a polynucleotide encoding the polypeptide expressed by SEQ ID NO: 5. Claim 6 recites the DNA sequence of claim 4. Applicants understood

that the Examiner's reference to "sequence identity" on line 13 of page 5, is directed to claims 4 and 6 because they are the only pending original claims in which "sequence identity" is recited directly (as in claim 4) or indirectly (as in claim 6). Because, as explained above, a person skilled in the art in view of the disclosure coupled with what is known in the art would be able to make and use the claimed sequences without undue experimentation, the rejection to claims 4 and 6 should be withdrawn.

Claims 15, 16, and 21 each recites a DNA sequence of claim 1, 2, or 3. Because the sequences of claims 1 and 2, as amended, are enabled as explained above, and further because the DNA sequence of claim 3 with respect SEQ ID NO:3 is enabled, the DNA sequence recited in claim 15, 16, or 21 is enabled as well.

2. **Rejection to Claims 1, 2, 4, 6, 7, 15, 16, and 21 under 35 USC 112, first paragraph, as containing subject matter which was not adequately described in the specification as filed.**

The Examiner alleges that the specification does not adequately describe DNAs that do not encode VSCC α2δ-C subunit but can hybridize to, share 70% sequence identity to, or are substantially similar to, SEQ ID NOS: 3. Accordingly, the Examiner requires that the claims must be limited to DNAs that actually encode VSCC α2δ-C subunit proteins related to SEQ ID NO:3. By this amendment, Applicants have amended relevant claims by adding the limitation that the DNA sequence encodes a VSCC α2δ-C subunit. In view of this amendment the rejection should be withdrawn.

3. **Rejection to Claims 1, 2, 15, 16, and 21 under 35 USC 112, Second Paragraph, as Being Indefinite.**

Claim 1 is considered by the Examiner as being indefinite for reasons related to the recitation of the term "substantially similar" in the claim and its definition in the specification. Applicants by this amendment have amended claim 1 whereby the term "substantially similar" is replaced with the phrase " at least a 70% identity." Because claim 1 as amended is directed a DNA sequence having a specific, definite sequence identity, and further because the ordinary meaning of "sequence identity" and method of determining it is known in the art, claim 1 as amended particularly points out and distinctly claims the subject which Applicants regard as the invention.

Claim 2 is considered by the Examiner as being indefinite on the ground that the scope of the claim will vary with any changes of the hybridization conditions and that there are multiple examples of what constitutes high stringency conditions in the specification. The Examiner requires that the conditions be explicitly recited in the claim. Applicants by this amendment have amended claim 2 to include a recitation to the hybridization conditions as required by the Examiner. Accordingly the rejection is overcome.

Claim 15 is rejected as being vague and indefinite because, according to the Examiner, the claim "does not recite clear and unambiguous steps." Applicants respectfully disagree, submitting that claim 15 as filed does clearly and unambiguously recites a step of the method, which is the "step of contacting a test sample ... with amplification reaction reagents," and that one-step methods are patentable subject matter. The Examiner also alleged that "it is unclear what " a region of the DNA sequence of Claim 1, 2, or 3" actually comprises because the metes and bounds of "region" is undefined." Again, applicants respectfully disagree. The claim is not limited to any one specific "region;" rather, it is directed to any region of the sequence that is desired to be amplified. Nonetheless, to make it more explicit, Applicants by this amendment have added in claim 15 the modifier "said region being desired to be amplified." Support for the amendment can be found in the application as filed, for example, on page 8, lines 11-17. The Examiner also alleges that "amplification reaction reagents is too generic without reference to at least a DNA primer that is some specified length of SEQ ID NO3." Again, Applicants would not agree with the Examiner because the term "amplification reaction reagents" is defined on page 8, lines 11-17, which does include a primer. In this respect, Examiner attention is respectfully drawn to the specification, lines 3-10 on page 8, where it states the amplification reaction reagents "comprising a pair of amplification primers such as those described above." Nonetheless, to make it more explicit, Applicants by this amendment have added in claim 15 the phrase "wherein said amplification reaction reagents comprises a pair of amplification primers and wherein said amplification primers each comprises at least 8 consecutive mucleotides of a polynucleotide of SEQ ID NO: 3." Support for this amendment can be found in the application as filed, for example, on page 8, lines 3-22.

Unlike the rejection to claims 1, 2, and 15, the Examiner has provided no specific reason for the rejection to claims 16 and 21. In view that the DNA sequence of claims 1 and 2 are recited in claims 16 and 21, Applicants thought that the rejection to claims 15 and 21 is based on the rejection to the sequence of claims 1 and 2. Because claims 1 and 2, as amended, are not indefinite as explained above, claims 15 and 21 are not indefinite either.

4. Rejection to Claims 1, 2, 15, and 21 under 35 USC 102 (b) as Being Anticipated by Harpold et al (WO/9504822, Harpold)

The Examiner states, "Harpold discloses SEQ ID NOS: 11 and 29-32 (pages 79-82) which are 'substantially similar' to the instant invention," citing part of the definition of "substantially similar" from specification. The Examiner further states, "The Harpold products may hybridize to SEQ ID NO: 3 since no hybridization conditions are recited in instant claim 2," and " Harpold teaches amplification methods (pages 27-28) that are encompassed by the broad and vague language of instant claim 15." As explained above, in response to rejections on other grounds, Applicants have amended claim 1 to delete the term "substantially similar," claim 2 to recite the hybridization conditions, and claim 15 to recite the specific amplification reaction reagents. Harpold does not disclose the sequence of claim 1 or 2 as amended, or the method of claim 15 as amended. Applicants respectfully submit that with amendments to the claims presented in this paper, the rejection is overcome or rendered moot.

5. Rejection to Claim 16 under 35 USC 103 (a) as Being Obvious over Harpold et al (WO/9504822, Harpold)

The Examiner rejected claim 16 as being obvious over Harpold. Claim 16 is directed to a kit for detecting the presence of DNA sequence of claim 1, 2, or 3 in a test sample. In response to other rejections Applicants by this amendment have amended claims 1 and 2 to add the limitation that the DNA sequence encodes a VSCC $\alpha 2\delta$-C subunit. Claim 3 as amended recites a sequence that the Examiner acknowledges is in condition for allowance. In contrast, Harpold teaches DNA sequences encoding a human calcium channel α, β, or γ subunit. Because Harpold does not teach or suggest the claim limitation that the DNA sequence "encoding a VSCC $\alpha 2\delta$-C subunit," nor does it teach or suggest the sequence recited in claim 3 as claim 3 is acknowledged by the Examiner to

be in condition of allowance if recitation to SEQ ID NO 4 is deleted, claim 16 is not obvious. "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." (MPEP 2143.03) "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious." (MPEP 2143.03)

6. Objection to Claims 3 and 5.

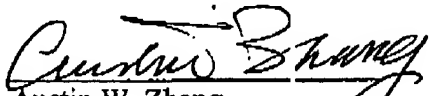
Claims 3 and 5 are objected to as reciting non-elected sequences The Examiner indicates that the two claims are in condition for allowance if the claims are amended in accordance with the election of invention to recite only SEQ ID NO: 3. Applicants by this amendment have amended claims 3 and 5 to recite only SEQ ID NO:3. Accordingly, claims 3 and 5 are in condition for allowance.

For the above reasons, Applicant respectfully requests that rejections or objections to the claims be withdrawn.

Applicants by this amendment have added new claims 35 and 36. Claim 35 is directed to an isolated and purified DNA sequence encoding a polypeptide of SEQ ID NO: 5, and claim 36 to an isolated and purified DNA sequence comprising a polynucleotide sequence encoding a polypeptide of SEQ ID NO: 5. The new claims are fully supported by the disclosure of the specification as filed. Entry of claims 35 and 36 is respectfully requested. No new matters have been added by this amendment to any of the claims of the application.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,



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